

1 **CLAIMS**

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3 1. A tool for circulating fluid in a well bore, the tool  
4 comprising a tubular assembly having a through  
5 passage between an inlet and a first outlet, the  
6 inlet and first outlet being adapted for connection  
7 in a work string, a second outlet extending generally  
8 transversely of the tubular assembly; an obturating  
9 member moveable between a first position closing the  
10 second outlet and a second position permitting fluid  
11 flow through the second outlet, the obturating member  
12 including restraining means to actively retain the  
13 obturating member independently in the first and the  
14 second positions; an engagement mechanism actuatable  
15 between an engaged configuration, in which the  
16 obturating member is locked in one of the first or  
17 second positions; and a disengaged configuration in  
18 which the obturating member can move to the other of  
19 the first and second positions; a fluid pressure  
20 actuation surface coupled to the engagement mechanism  
21 and biased by a spring located between the tubular  
22 assembly and the engagement mechanism; wherein  
23 variation of fluid pressure on the actuation surface  
24 controls actuation of the engagement mechanism and  
25 stroking the tool in the disengaged configuration  
26 moves the obturating member.

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28 2. A tool as claimed in Claim 1 wherein the obturating  
29 member comprises a sleeve axially slid able within the  
30 tubular assembly.

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32 3. A tool as claimed in Claim 1 or Claim 2 wherein the  
33 restraining means is a collet.

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- 2     4. A tool as claimed in Claim 3 wherein the collet is
- 3        retainable in a plurality of recesses on the tubular
- 4        assembly.
- 5
- 6     5. A tool as claimed in any one of the previous claims
- 7        wherein the fluid pressure actuation surface is
- 8        located on an actuator sleeve axially slid able within
- 9        the tubular assembly.
- 10
- 11    6. A tool as claimed in Claim 5 wherein a portion of the
- 12        actuator sleeve is located across the collet.
- 13
- 14    7. A tool as claimed in any one of the previous claims
- 15        wherein the engagement mechanism comprises mutually
- 16        engageable formations on each of the actuator sleeve
- 17        and the tubular assembly.
- 18
- 19    8. A tool as claimed in Claim 7 wherein the formations
- 20        comprise a pin and a groove.
- 21
- 22    9. A tool as claimed in Claim 8 wherein the groove is
- 23        continuous so that the pin can travel in a continuous
- 24        cycle around the groove.
- 25
- 26    10. A tool as claimed in Claim 9 wherein the groove
- 27        comprises a plurality of apexes and bases such that
- 28        the pin moves longitudinally to the tubular assembly,
- 29        for at least a portion of the cycle.
- 30
- 31    11. A tool as claimed in any one of the previous claims
- 32        wherein the second outlet comprises a plurality of

1       ports in the tubular assembly which communicate with  
2       the inlet.

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4       12. A tool as claimed in Claim 11 wherein the ports are  
5       distributed circumferentially around the outer  
6       surface of the tubular assembly.

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8       13. A tool as claimed in any one of the previous claims  
9       wherein the cross-sectional area of the first outlet  
10      is greater than the cross-sectional area of the  
11      second outlet.

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13      14. A method for circulating fluid in a well bore, the  
14      method comprising the steps:

15       (a) inserting a work string into the well bore, the  
16       work string having a fluid inlet, a first fluid  
17       outlet and a second fluid outlet, an obturating  
18       member which is moveable between a first and  
19       second position to respectively close and open  
20       the second fluid outlet, and an engagement  
21       mechanism which when engaged locks the  
22       obturating member in one of the first or second  
23       positions;

24       (b) varying the fluid pressure through the work  
25       string to move the engagement mechanism between  
26       locked and unlocked configurations; and

27       (c) stroking the work string to move the obturating  
28       member between the first and second positions.

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30      15. A method as claimed in Claim 14 wherein varying the  
31       fluid pressure through the work string is achieved by  
32       pumping fluid through the work string.

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1 16. A method as claimed in Claim 15 wherein the method  
2 includes the step of running the work string in a  
3 closed and locked configuration with the pumps turned  
4 off.

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6 17. A method as claimed in Claim 15 or Claim 16 wherein  
7 the method includes the step of drilling with the  
8 work string in a closed and locked configuration and  
9 in compression while pumping fluid.

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11 18. A method as claimed in Claims 15 to 17 wherein the  
12 method includes the step of back reaming with the  
13 work string in a closed and unlocked configuration  
14 and in tension while pumping fluid.

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16 19. A method as claimed in Claims 15 to 18 wherein the  
17 method includes the step of opening the second outlet  
18 with the work string in tension with the pumps off.

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20 20. A method as claimed in Claims 15 to 19 wherein the  
21 method includes the step of stroking the work string  
22 in a locked and open configuration while pumping  
23 fluid.

24

25 21. A method as claimed in Claims 15 to 20 wherein the  
26 method includes the step of stroking the work string  
27 in a locked and open configuration with the pumps  
28 off.

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30 22. A method as claimed in any one of Claims 14 to 21  
31 wherein the method includes operating the work string  
32 in a cyclic manner through the following  
33 configurations:

- 1       (a) locked closed;
- 2       (b) unlocked closed;
- 3       (c) unlocked open;
- 4       (d) locked open;
- 5       (e) unlocked open; and
- 6       (f) unlocked closed.